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A CLINICAL STUDY ON *TIMIRA* W.S.R. POSTERIOR SEGMENT PATHOLOGIES & ITS MANAGEMENT WITH *USHIRAADI ANJANA*

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ABSTRACT

Timira is one of the grave diseases posing a challenge to eyesight. It disturbs the physiology of visual perception and even terminates blindness. Many of the clinical features described for *Timira* are having similarities with the diseases of the anterior segment and posterior segment of the eye. A previous study was conducted by Renu et al to see the effect of *Ushiraadi Anjana* on Anterior segment pathologies of an eye. The present study was planned to see the effect of the same (*Ushiraadi Anjana*) in a group of diseases of the posterior segment of the eye. A total number of 25 patients were studied in four groups. In all the groups; treatment with local application of *Ushiraadi Anjana* in a dose of 3 *Vidanga Matra* (90mg) was used for 2 months with a follow-up period of 1 month. The results obtained from the study showed that there was mild relief in subjective parameters whereas no objective changes were found in any of the pathologies of the posterior segment. This may be due to *Ropana* and *Prasadana*'s actions toward *Ushiraadi Anjana*. Probably *Anjana* procedure is done without *Shodhana* and *Shamana* therapies might be the reason for not obtaining many effects in Posterior segment pathologies in this study.

Keywords: *Timira, Ushiraadi Anjana, Vidanga, Ropana, Prasadana*

INTRODUCTION

Eyes are the gateways of the external world, and visual defects are tantamount to the obliteration of the world. The diseases of the eyes are classified vividly in *Ayurvedic* classics. In *Ayurveda*, as per the pathological site, one group of eye diseases known as *Drishtigata Rogas* (diseases of visual apparatus responsible for visual impairment) are described. *Timira* (wordily meaning- darkness**)** involving the *Patalas* (layers of the eye), is considered to be the most important and serious disease among *Drishtigata Rogas.* [1] The anatomical consideration of *Patalas*& symptoms of vitiated *Doshas* (vitiated humor) situated in these *Patalas* reveals that the *Timira* is nothing but a disease of the anterior & posterior segments of the eye in which vision is hampered. If it is not treated in time it leads to *Kacha* (discoloration) & then *Linganaash* i.e. total blindness.[2]

The clinical picture of *Timira* simulates refractive errors, presbyopia, very early lenticular hydration, vitreous pathologies & diseases of the retina like Central serous retinopathy (CSR), Age-related macular degeneration (ARMD), Cystoid macular edema (CME), Vitreous haemorrhage (VH). CSR is characterised by spontaneous serous detachment of the neurosensory retina in the macular region, with or without retinal pigment epithelium detachment. ARMD, senile macular degeneration, is a bilateral disease of persons 59 years of age or older. CME refers to the collection of fluid in the outer plexiform layer (henle's layer) and an inner nuclear layer of the retina, centered around the foveola. VH usually occurs from the retinal vessels and may present as pre-retinal (sub-hyaloid) or an intracell haemorrhage. The intracell haemorrhage may involve the anterior, middle, posterior, or the whole vitreous body. Modern ophthalmology even though has become well advanced in diagnosing retinal diseases precise but has its own limitations in treating these disorders. Hence there is an urgent need to search the alternate treatment in these conditions. Functional regulation of the eye is done by *Tridosha, Saptadhatu,* and *Mala,* as per *Ayurvedic* concepts. So the treatment of ocular disorders is in no way different from systemic disorders along with the local treatment procedures termed *Kriyakalpa*. *Kriyakalpa* procedures described in classical literature-*Seka* (pouring a fine stream of medicated liquid over closed eyes), *Aschyotana* (putting medicated drops in the eyes), *Tarpana* (pouring medicated *Sneha* over eyelids in an enclosure), *Putapaka* (pouring medicated drops prepared by *Putapaka* method in the eyes) and *Anjana* (applying Collirium) are in practice as per their indications and needs.[3]Among these *Anjana* is one of the most potent and long-acting procedures in which medicine is applied topically in the conjunctival sac and lid margin. It is said to be done in the *Nirama* (chronic) state of ocular diseases and indicated in many of the ocular pathologies wherein foremost is *Timira.*[4] *Acharya Vagbhatta* has described *Ushiraadi Anjana* in the treatment of *Sannipataja Timira*.[5] Its contents have *Sheeta Virya*, *Ropana* (Healing) *&Prasadana* (Soothing) properties. Moreover, *Ushira* and *Pippali* are having *Balya* properties; *Goghrita* is *Indriya Balavardhaka*; *Saindhav* and *Madhu* are having *Chakshushya* properties. In a previous research work done by Renu Rao et al, *Ushiraadi Anjana* was used to seeing improvement in visual outcomes in anterior segment pathologies of an eye (Myopia, Hypermetropia, Astigmatism, and Presbyopia). Hence to see the therapeutic action of the same *Anjana*, the present study was conducted to verify its role in a group of diseases of the posterior segment of the eye (Central Serous Retinopathy, Age-Related Macular Degeneration, Cystoid Macular Edema, Vitreous Hemorrhage).

Null hypothesis- *Ushiraadi Anjana* is not effective in the Posterior segment of the eye (Central Serous Retinopathy, Age-Related Macular Degeneration, Cystoid Macular Edema, Vitreous Hemorrhage)

Aims and Objectives: To evaluate the efficacy of *Ushiraadi Anjana* in posterior segment diseases of eye w.s.r. CSR, ARMD, CME and VH.

Materials and Methods:

Patients attending the OPD and IPD of the department of *Shalakya Tantra* of I.P.G.T. & R.A. Hospital, Jamnagar were selected on the basis of subjective and

objective criteria for diagnosis, irrespective of their sex, religion, occupation, education, etc. A total number of 25 patients were studied in four groups viz-

Group A: Central Serous Retinopathy- 06 Patients

Group B: Age-Related Macular Degeneration- 10 Patients

Group C: Cystoid Macular Edema- 07 Patients

Group D: Vitreous Hemorrhage- 02 Patients

The clinical study was carried out in three phases -

1. Diagnostic phase
2. Interventional phase
3. Assessment phase

Diagnostic Phase:

The diagnosis of stated disorders was done on the basis of a complete examination and findings were recorded in the specially designed case proforma. The examinations carried out were-

 Best corrected visual acuity was noted using Snellen's chart (for distant vision) and Jaegar's chart (for near vision).

 Slit Lamp Examination was done for any gross pathology in the anterior segment.

 Visual field examination was done by confrontation method.

 Colour vision was assessed by Ishihara's isochromatic chart.

 Distorted vision was tested by Amsler grid examination chart.

 Ocular pressure was examined by the Schiotz tonometry method.

 Fundus was examined by Direct Ophthalmoscope (DO) for evidence after complete pupil dilatation with short-acting mydriatic Tropicacyl Plus Eye drops (Combination of Phenylephrine and Tropicamide). Due care was taken to rule out Glaucoma and Hypertension in the patients before administering eye drops to avoid complications.

Investigations

Biochemical tests, Routine hematological, Urine, and Stool analysis were carried out before treatment to rule out any systemic disease.

Hematological Examination -- Hb%, ESR, TLC, DLC

Biochemical Examination -- FBS, PPBS, Serum lipid profile

Criteria for selection:

Inclusion Criteria

1. Patient willing for registration.
2. C.S.R. with characteristic signs and symptoms having distant visual acuity (DVA) >6/60.
3. Non –exudative type of ARMD/Dry ARMD.
4. Macular edema is secondary to Diabetic retinopathy (DR) /Hypertensive retinopathy / Branch retinal vein occlusion (BRVO) / Branch retinal artery occlusion (BRAO).
5. Vitreous hemorrhages in the Sub-hyaloid region or intragel (Anterior/Middle/Posterior region of the vitreous).

Exclusion Criteria

1. C.S.R. with DVA< 6/60
2. C.S.R. with retinal detachment.
3. Exudative/ Neovascular ARMD
4. Vitreous degeneration/Total vitreous hemorrhages threatening tractional vitreo-retinal detachment.

Study Design (Grouping): The selected diseases/problems were assigned into groups as follows and the same treatment was given in all groups. The evaluation was done by an open clinical trial method.

Duration of Therapy & Follow-Up: The study was intervened by the treatment with ***"Ushiraadi Anjana"*** (*Rasakriyaanjna)* in all four groups.

Dose:-3 *Vidanga Matra* (i.e., approx. 90 mg) per day in two divided doses.

Duration:-2 months.

Route of Administration:-Topical

Follow up: - 1 month.

After completion of the treatment patients were followed up for a further month to note withdrawal/adverse effects of the treatment.

Criteria for Assessment

Group A (C.S.R.)

Subjective-

1. Blurred vision

2. Micropsia, macropsia, metamorphopsia (distorted vision)

Objective-

1. Exudates, hemorrhage in fundus

2. Elevated macular area with a ring reflex
3. Absent foveal reflex

GROUP B (ARMD-Dry Type)

Subjective-
1. Blurred vision
2. Metamorphopsia
3. Positive scotoma

Objective-
1. Drusen's
2. Reduced contrast sensitivity

Group C (Cystoid Macular Edema)

Subjective-
1. Blurred vision/loss of vision

Objective-
1. Slightly elevated macular area
2. Absent foveal reflex

Group D (Vitreous Hemorrhage)

Subjective-
1. Blurred vision/loss of vision

Objective
1. Bright Red/ Dark Fundus glow

Criteria of Assessment:

The assessment was done on the basis of improvement in clinical features as per Gradation Index (Table-1) Visual Acuity was recorded as a numerical convention and later converted into percentages as per the method of Kaith Lyle et al, 1985 (Table-2,3)

Criteria for Overall Assessment:

Cured : 100 % relief in signs and symptoms and no recurrence during the follow-up study was considered as cured.

Marked improvement: 76 % to 99% improvement in signs and symptoms was recorded as a marked improvement.

Moderate improvement: 51 % to 75 % improvement in signs and symptoms was considered a moderate improvement.

Mild improvement: 26 % to 50 % improvement in signs and symptoms was considered a mild improvement.

Unchanged: Upto 25 % reduction in signs and symptoms was noted as unchanged.

Observations- (Table-5,6)

Out of the total 25 patients, a maximum number of patients i.e., 46.15% belonged to the age group of 60-75 years; followed by 30.77% of patients belonging to the 30-45 years of age group. 65.38% of patients were males whereas 30.77% of patients were females.42.31% of patients were uneducated.65.38% of patients were belonging to the middle class.34.62% of patients were addicted to tobacco whereas 11.54% were addicted to smoking. 80.77% of patients were having gradual loss of vision, 15.38% of patients were having a sudden loss of vision, 19.23% were having a distorted vision, 38.46% were having a perception of flashes of light, 42.31% were having floaters, 34.62% were having a perception of black spots in the field of vision and 38.46% were having problem of delayed dark adaption as a clinical feature.

Results-

In the present study, a total of 25 patients were registered and completed the treatment. The effect of therapy in groups A, B, and C are presented here. Group D had only 02 patients who could not be analyzed statistically hence not presented here. (Table-4)

Effect of Therapy on Clinical Features in Each Group-

Group A (Table7-11)

Statistically insignificant results were observed in sudden and gradual loss of vision in both eyes. No significant clinical improvement was observed in the perception of flashes of light and dark adaptation with dim light as well in both eyes. In distant visual acuity, statistically insignificant results were observed in both eyes. In pin holes, statistically insignificant results were observed in the right eye whereas significant results were observed in the left eye. Statistically, results were not applicable to improvement in near visual acuity in both eyes. Group B (Table 12-16) In the right eye highly significant clinical improvement was observed in gradual loss of vision whereas statistically insignificant results were found clinically in the perception of flashes of light, the problem for dark adaptation, distorted vision, perception of black spots in the field of vision and floaters' left eye statistically insignificant results were observed in loss of vision, distorted vision, perception

of black spots, the problem for adaptation with dim light and floaters. In distant visual acuity, statistically significant results were observed in the right eye whereas results were not applicable statistically in the left eye. Statistically, results were not applicable in pin hole and near vision acuity in both eyes. Group C (Table 17-21) Statistically insignificant results were observed in gradual loss of vision, perception of flashes of light, the problem of dark adaptation, distorted vision, perception of black spots in the field of vision, and floaters in both eyes. Statistically, results were not applicable in distant visual acuity, pin hole, and near visual acuity in both eyes.

Effect of Therapy on Direct Ophthalmoscopy of Total 25 Patients (Table-22,23)

Statistically, results were not applicable in the appearance of media, optic disc, blood vessels, and general background of the fundus in both eyes.

Improvement in the signs like macular edema, ring reflex, drusen's, and vitreous hemorrhage was insignificant in both eyes.

The overall effect of therapy on chief complaints (Table-24, 25)

No significant results were obtained in any of the chief complaints of the patients in either the eyes.

Overall Effect of Therapy (Table-26)

12% of patients got marked improvement, 04% of patients were moderately improved, 64% of patients got mild improvement, 20% of patients remained unchanged and none of the patients were completely cured.

DISCUSSION

In Group A (C.S.R.) the maximum of patients belonged to the 30-45 years of age group. In Group B 70% of patients were 60-75 years of age group. These observations even in this very small sample suggest the similarity to the classical literature of modern ophthalmology and survey studies both. In Group A 66.67% were males, which shows the male predominance nature of C.S.R. Studies suggest a higher prevalence of ARMD in women, particularly in those who experience earlier onset of menopause, which suggests that estrogen may play a protective role in minimizing ARMD risk.[6]In this study also, there is a female predominance in Group B patients and all the females were menopausal age. This observation is in accordance with the literature. *Rajonivrutti* (menopause) reflects the *Dhatu Kshaya* phase of life which vitiates the *Vata Dosha.*[7]The majority of patients belonging to the middle class indicate nutritional deficiency and stress in them. 46.16% of patients were found to be addicted to tobacco chewing and smoking. Studies have found that smokers have up to three to four times greater risk of developing ARMD and C.S.R as compared to non-smokers and that the more someone smokes, the greater the risk. The mechanism by which smoking might affect the retina is unknown, although oxidative insults to the retina have been implicated.[8] On Distant visual acuity significant improvement was seen in Group B. ARMD may be considered as *Pitta*-dominant disease. *Ushiraadi Anjana* has *Tridoshahara* properties and its contents like *Ushira and Ghrita* mainly *Pittahara*. But despite slight vision improvement in group B (ARMD) distortion of the object was not changed which signifies that the basic pathology at RPE and photosensitive cell layer remains unchanged.

No improvement in suddenly lost vision was observed in any group hence it can be concluded that *Anjana* has no role to play in it. On the Black spot, no improvement was suggestive of unaltered transient ischemia of the outer layer of the retina. On Flashes of light, there was an insignificant improvement. It needs further verification in a larger sample to comment on the changes in the basic pathology of photosensitive layer detachment or photosensory cell death. As there is no reversal of the pathology at the RPE level hence the nutritional status of the photosensory layer is not altered and the results remain unchanged on dark adaptation. Insignificant change in perception of floaters signifies no alteration in the pathology either at the ciliary body or at the vitreous humour level.

Probable Mode of Action of *Ushiraadi Anjana*

Route of drug administration, solubility and bioavailability of drugs absorbing surface whether it is skin, conjunctiva, cornea, naso-lacrimal duct or oral

mucosa or all together, vascularity of the absorbing surface, the physical state of drug, patient compliance, excretion of the drug –all of these influence the action of ocular administration. Drug absorption is a complex process depending upon drug properties such as solubility and permeability, formulation factors, and physiological variables including regional permeability differences, pH, etc. In *Anjana*, absorption happens through the skin, conjunctiva, cornea, nasal mucosa, and oral cavity. After absorption through the skin, conjunctiva, cornea, aqueous humour, and circulation, the drug gets metabolized and mitigates/eliminates the *Doshas*.[9]The pH (5.26) of the test drug *Ushiraadi Anjana* permits easy penetration of the drug locally. As soon as it is applied with the acidic pH and *Katu, Lavana Rasa* it first increases the local blood supply to the whole eye, paving way for more drug absorption. The human cornea is composed of 5 tissue types with 3 of them- epithelium, endothelium, and stroma, being the main barriers to absorption. The relatively lipo-philic corneal epithelium, which has low porosity and high tortuosity due to tight annular junctions, is the main barrier for hydrophilic drugs, whereas the middle stromal layer, which consists mainly of water interspersed with collagen fibrils and accounts for most of the cornea's thickness, is the main barrier for lipophilic drugs. Ionized compounds are more readily sequestered in the cornea, which serves as a drug depot for prolonged drug delivery and activity. It is well established that the permeability of ocular drugs is contingent primarily on their lipid or water solubility. The epithelium and endothelium of the cornea have 100 times the lipid contents of the stroma and fat-soluble drugs readily penetrate these cellular layers.[10] As the test drug also has biphasic nature i.e. both water and fat-soluble, this facilitates the absorption very rapidly. During preparation, the drug was triturated many times and converted into micro-fine particles as necessary for ionic form. These micro-fine particles remain in the cul-de-sac of conjunctiva for a longer time. Drugs can reach the systemic circulation after topical ocular delivery by several routes, including through the aqueous humor, ciliary body, iris, and, most importantly, the nasal mucosa.[11]An instilled drug penetrates the eye by absorption across the cornea from the precorneal tear film. The precorneal tear film is a stagnant fluid layer that is spread over the corneal epithelium by a coacervate of mucin and is stabilized by the superficial oily layer formed by meibomian gland secretion. Therefore mixing of the drug with the marginal tear fluid after drugs are instilled takes place only by blink movements, which at the same time carry the instilled drug away from the cul-de-sac. Thus the mixing and kinetic behaviour of drugs in the tears has a direct bearing on the efficiency of drug absorption by the eye.[12] In *Ayurveda*, the pharmacological actions of a drug may be explained according to its pharmacological properties like *Rasa*, *Guna*, *Virya*, *Vipaka*, and *Prabhava*. In *Ushiraadi Anjana; Ushira* is having *Tikta ,Madhura Rasa, Sheeta Virya* and *Ruksha Guna* due to which it is *Kapha Pitta Shamaka*[13]. *Pippali* is having *Katu Rasa*, *Madhur Vipaka, Anushna Virya, and Tikshna Guna* due to which it is *Kapha Vata Shamak, Rakta Shodhaka*, *Rasayana* and *Balya*.[14]*Saindhava* is having *Madhur Rasa*, *Madhura Vipaka*, and *Sheeta Virya* properties due to which it is *Chakshushya*.[15]*Madhu* is having *Madhura Rasa, Madhura Vipaka, SheetaVirya*, *Ruksha Guna* properties due to which it is *Tridosha Shamaka* along with *Chakshushya* and *Ropana*.[16]*Go Ghrita* is having *Madhur Vipaka*, *Sheeta Virya*, *Vata Pitta shamaka*, *Chakshushya* and *Balya* properties.[17]Moreover, *Go Ghrita* provides a better medium of absorption. Thus, the overall effect of *Ushiraadi Anjana* is *Tridoshashamaka*, *Rasayana*, *Chakshushya*, *Balya*, *Indriya Balavardhaka*, and *Dhatuposhaka*.

CONCLUSION

From the results obtained, it can be inferred that *Ushiraadi Anjana* has shown less potential in altering any of the pathologies of posterior segment/*Timira*, only subjective change in vision was there. There was a very small number of patients registered in the individual groups. Hence larger sample size should be there to see the effect of the drug on posterior segment pathologies.

Table 1:- Gradation Index: - For Clinical Features

Difficulty in Day Vision	Grade 0 - Grade 1- Grade 2- Grade 3-	No difficulty in day vision. Difficulty in distance vision but no interference with routine work. Occasionally interference with day-to-day working. Cannot do any work in bright day light.
Diminished Vision	Grade 0- Grade 1- Grade 2- Grade 3-	No diminished vision. Dimness in vision but without inhibiting activities Sometime difficulty in performing routine work Unable to go out independently.
Distorted vision (Amsler's grid)	Grade 0- Grade 1- Grade 2- Grade 3-	No distorted vision Lines are crooked or bent Boxes appeared different in size and shape from each other Boxes and Lines are wavy and missing.
Perception of black spots	Grade 0- Grade 1- Grade 2- Grade 3-	No perception of black spots. Occasionally interfering with routine work. Regular interferes with routine work. Cannot perform routine work
Dark adaptation	Grade 0- Grade 1- Grade 2- Grade 3-	Adaptation to the darkness within a few seconds Slow dark adaptation within 10 seconds Slower dark adaptation within 20 seconds Slowest dark adaptation after 1 minute

Table-2: Snellen's test types: For Distant visual acuity

Vision chart reading	Grading score
6/6	0
6/9	1
6/12	2
6/18	3
6/24	4
6/36	5
6/60	6
<6/60	7

Table-3: Jaegar's Chart Reading: - For Near visual acuity

Jaegar's Chart Reading	Grading score
N 6	0
N 9	1
N 12	2
N 18	3
N 24	4
N 36	5
N 60	6
<N 60	7

Table – 4: Status of patients

	Number of Patients				
	Group A	**Group B**	**Group C**	**Group D**	**Total**
Registered	06	10	7	02	25
Completed	06	10	7	02	25
Drop Out	00	0	0	00	00

Table – 5: General Observation of Patients

Observations	**Group A (CSR)**	**Group B (ARMD)**	**Group C (CME)**	**Group D (VH)**	Total	%
Age(60-75yrs)	00	07	04	01	12	46.15
Age(30-45yrs)	05	01	02	00	08	30.77
Sex(Male)	04	03	05	02	14	65.38
Female	02	07	02	00	11	30.77
Uneducated	01	04	05	01	11	42.31
Middle class	04	09	03	02	17	65.38
Addiction (Tobacco)	02	03	02	00	09	34.62
Addiction (Smoking)	01	00	01	01	03	11.54
Chronicity(0-1 Year)	05	08	02	01	16	61.54

Table – 6: Chief complaints wise distribution

Complaints	**Group A**	**Group B**	**Group C**	**Group D**	**Total**	**%**
Sudden diminished vision	03	00	00	01	04	15.38
Gradual loss of vision	03	10	07	01	21	80.77
Distorted vision	00	04	01	00	05	19.23
Perception of black spots in the field of vision	00	04	03	02	09	34.62
Perception of flashes of light	02	05	03	00	10	38.46
Floaters	00	04	06	01	11	42.31

Table-7: Effect of Therapy on Chief Complaints, Group A (CSR) (Rt. eye)

Chief Complaints	No. of Patients	Mean		Mean± **SE**	%	S.D.	T	P
		BT	AT					
Sudden loss of vision	3	0.57	0.42	0.14 ±0.38	25	0.38	0.38	0.69
Gradual loss of vision	3	0.86	0.42	0.42 ±0.31	50	0.53	1.39	0.36
Perception of flashes of light	2	0.43	0.14	0.28 ±0.35	66.67	0.49	0.83	0.40
Delayed dark adaptation	2	0.43	0.14	0.28 ±0.35	66.67	0.49	0.83	0.40

Table-8: Effect of Therapy on Chief Complaints, Group A (CSR) (Lt. eye)

Chief Complaints	No. of Patients	Mean		Mean± **SE**	%	S.D.	T	P
		BT	AT					
Sudden loss of vision	2	0.57	0.28	0.28±0.34	50	0.49	0.83	0.50
Gradual loss of vision	2	0.71	0.42	0.28±0.36	40	0.49	0.83	0.62
Perception of flashes of light	2	0.43	0.14	0.28±0.36	66.67	0.49	0.83	0.40
Delayed dark adaptation	2	0.43	0.14	0.28±0.49	66.67	0.49	0.59	0.40

Table-9: Effect of Therapy on Distant visual acuity, Group A (CSR)

	No. of Eyes	Mean	Mean± **SE**	%	S.D.	T	P

		BT	AT					
Rt Eye	6	2.67	1.67	1 ±0.63	37.50	1.09	1.58	0.21
Lt Eye	6	3.83	2.67	1.16 ±0.33	30.43	0.75	3.47	0.27

Table-10: Effect of Therapy on Pin hole, Group A (CSR)

	No. of Eyes	Mean		Mean± **SE**	%	S.D.	T	P
		BT	AT					
Rt Eye	6	1.33	1	0.33 ±0.37	25	0.52	0.91	0.45
Lt Eye	6	2.33	1.67	0.67 ±0.26	28.57	0.52	2.58	0.12

Table-11: Effect of Therapy on Near visual acuity, Group A (CSR)

	No. of Eyes	Mean		Mean± **SE**	%	S.D.	T	P
		BT	AT					
Rt Eye	6	1.33	1.33	0.00	0	0	NA	
Lt Eye	6	1.33	1.33	0.00	0	0	NA	

Table-12: Effect of Therapy on Chief Complaints, Group B (ARMD) (Rt.Eye)

Chief Complaints	No. of Patients	Mean		Mean± **SE**	%	S.D.	T	P
		BT	AT					
Gradual loss of vision	10	2.2	1.1	1.1±0.1	50	0.32	11	0.0001
Perception of flashes of light	4	0.6	0.44	0.2±0.29	33.33	0.42	0.67	0.53
Delayed dark adaptation	5	0.9	0.5	0.4±0.26	44.44	0.52	1.55	0.28
Distorted image	2	0.2	0.2	0	0	0	0	>0.99
Floaters	5	0.6	0.5	0.1±0.32	16.67	0.32	0.32	0.88
Black spot in front of the eyes	5	0.8	0.6	0.2±0.29	25	0.42	0.67	0.62

Table-13: Effect of Therapy on Chief Complaints, Group B (ARMD) (Lt.Eye)

Chief Complaints	No. of Patients	Mean		Mean± **SE**	%	S.D.	T	P
		BT	AT					
Gradual loss of vision	10	2.3	1.3	1±0	43.47	0	0	0.002
Perception of flashes of light	7	0.7	0.4	0.3±0.28	42.85	0.48	1.07	0.34
Delayed dark adaptation	5	0.9	0.4	0.5±0.24	55.56	0.53	2.12	0.14
Distorted image	2	0.3	0.2	0.1±0.32	33.33	0.32	0.32	0.69
Floaters	5	0.6	0.5	0.1±0.32	16.67	0.32	0.32	0.72
Black spot in front of the eyes	4	0.7	0.5	0.2±0.29	28.57	0.42	0.67	0.63

Table-14: Effect of Therapy on Distant visual acuity, Group B (ARMD)

	No. of Eyes	Mean		Mean± **SE**	%	S.D.	T	P
		BT	AT					
Rt Eye	10	4.50	3.50	1 ±0.00	22.22	0.67	1.58	0.39
Lt Eye	10	4.70	3.50	1.20 ±0.00	25.53	0.79	NA	

Table-15: Effect of Therapy on Pin hole, Group B (ARMD)

	No. of Eyes	Mean		Mean± **SE**	%	S.D.	t	P
		BT	AT					
Rt Eye	10	2.20	1.90	0.33 ±0.00	13.64	0.67	NA	
Lt Eye	10	2.80	2.30	0.50 ±0.00	17.86	0.85	NA	

Table-16: Effect of Therapy on Near visual acuity, Group B (ARMD)

	No. of Eyes	Mean		Mean± **SE**	%	S.D.	t	P
		BT	AT					
Rt Eye	10	4.90	4.90	0.00	0	0	NA	
Lt Eye	10	5.40	5.30	0.1±0. 00	1.85	0.32	NA	

Table-17: Effect of Therapy on Chief Complaints, Group C (CME) (Rt.Eye)

Chief Complaints	No. of Patients	Mean		Mean± **SE**	%	S.D.	T	P
		BT	AT					
Gradual loss of vision	6	2.43	1.86	0.57±0.27	30.77	0.53	2.14	0.35
Perception of flashes of light	2	0.57	0.14	0.43±0.45	75	0.79	0.94	0.29
Delayed dark adaptation	2	0.29	0.29	0.00	0	0.00	0.00	>0.99
Distorted image	1	0.42	0.29	0.14±0.38	50	0.38	0.38	0.79
Floaters	5	1.43	0.86	0.57±0.27	40	0.53	2.14	0.28
Black spot in front of the eyes	2	0.71	0.43	0.28±0.35	40	0.79	0.83	0.62

Table-18: Effect of Therapy on Chief Complaints, Group C (CME) (Lt.Eye)

Chief Complaints	No. of Patients	Mean		Mean± **SE**	%	S.D.	T	P
		BT	AT					
Gradual loss of vision	6	2	1.29	0.71 ±0.22	55.56	0.49	3.27	0.26
Perception of flashes of light	2	0.43	0.14	0.29 ±0.35	66.67	0.49	0.83	0.40
Delayed dark adaptation	2	0.29	0.29	0	0	0	0	>0.99
Distorted image	1	0.43	0.43	0	0	0	0	>0.99
Floaters	6	1.57	0.86	0.71 ±0.21	45.45	0.49	3.27	0.14
Black spot in front of the eyes	3	0.86	0.43	0.43 ±0.30	50	0.53	1.39	0.45

Table-19: Effect of Therapy on Distant visual acuity, Group C (CME)

	No. of Eyes	Mean		Mean± **SE**	%	S.D.	t	P
		BT	AT					
Rt Eye	7	5	4.29	0.71 ±0.00	14.29	0.95	NA	
Lt Eye	7	5	4	1 ±0.00	20	0.82	NA	

Table-20: Effect of Therapy on Pin hole, Group C (CME)

	No. of Eyes	Mean		Mean± **SE**	%	S.D.	t	P
		BT	AT					
Rt Eye	7	4.42	4	0.42 ±0.00	9.67	0.53	NA	
Lt Eye	7	4	3.57	0.43 ±0.00	10.71	0.53	NA	

Table-21: Effect of Therapy on Near visual acuity, Group C (CME)

	No. of Eyes	Mean		Mean± **SE**	%	S.D.	T	P
		BT	AT					
Rt Eye	7	5.14	5.14	0.00	0	0	NA	
Lt Eye	7	5.14	5.14	0.00	0	0	NA	

Table-22: Effect of therapy on Direct Ophthalmoscopy (Rt eye) of 25 patients

	No. of Eyes	Mean		Mean± **SE**	%	S.D.	T	P
		BT	AT					

Media	25	0.82	0.82	0.00 ± 0.00	0.00	0.00	NA	
B/V	25	0.00	0.00	0.00 ± 0.00	0.00	0.00	NA	
Optic disc	25	0.00	0.00	0.00 ± 0.00	0.00	0.00	NA	
G.B.	25	1.00	1.00	0.00 ± 0.00	0.00	0.00	NA	
Drusens	22	1.84	1.60	0.24±0.18	15.91	0.43	1.61	0.35
Macular oedema	06	0.32	0.24	0.08±0.19	1.41	0.19	0.41	0.54
Ring reflex	04	0.16	0.16	0.00 ± 0.00	0.00	0.00	NA	>0.99
Vitreous hemorrhage	02	0.08	0.11	0.00 ± 0.00	0.00	0.00	NA	0.69

Table-23: Effect of therapy on Direct Ophthalmoscopy (Lt. eye) of 25 patients

	No. of Eyes	Mean		Mean± **SE**	%	S.D.	T	P
		BT	AT					
Media	25	0.82	0.82	0.00 ± 0.00	0.00	0.00	NA	
B/V	25	0.00	0.00	0.00 ± 0.00	0.00	0.00	NA	
Optic disc	25	0.00	0.00	0.00 ± 0.00	0.00	0.00	NA	
G.B.	25	1.00	1.00	0.00 ± 0.00	0.00	0.00	NA	
Drusens	22	1.76	1.48	0.28±0.17	15.91	0.43	1.61	0.28
Macular oedema	06	0.36	0.28	0.08±0.19	1.41	0.19	0.41	0.55
Ring reflex	04	0.16	0.16	0.00 ± 0.00	0.00	0.00	NA	>0.99
Vitreous haemorrhage	02	0.08	0.11	0.00 ± 0.00	0.00	0.00	NA	0.69

Table-24: Overall effect of therapy on Chief Complaints (Rt. Eye)

Chief Complaints	No. of Patients	Mean		Mean± **SE**	%	S.D.	T	P
		BT	AT					
Sudden loss of vision	02	0.12	0.08	0.04±0.2	33.33	0.2	0.2	0.70
Gradual loss of vision	21	1.96	1.25	0.76±0.12	38.78	0.52	6.16	0.01
Perception of flashes of light	08	0.52	0.25	0.28±0.22	53.84	0.54	1.27	0.16
Delayed dark adaptation	25	0.56	0.32	0.24±0.18	42.86	0.43	1.35	0.21
Distorted image	03	0.2	0.16	0.04±0.2	20	0.2	0.2	0.80
Floaters	11	0.68	0.48	0.20±0.18	29.41	0.41	1.09	0.26
Black spot in front of the eyes	09	0.64	0.48	0.16±0.19	25	0.37	0.86	0.77

Table-25: Overall effect of therapy on chief complaints (Lt. Eye)

Chief Complaints	No. of Patients	Mean		Mean± **SE**	%	S.D.	T	P
		BT	AT					
Sudden loss of vision	02	0.16	0.08	0.08±0.19	50	0.28	0.40	0.52
Gradual loss of vision	20	1.88	1.16	0.72±0.11	38.29	0.46	6.67	0.01
Perception of flashes of light	09	0.52	0.25	0.28±0.17	53.85	0.46	1.62	0.08
Delayed dark adaptation	09	0.56	0.28	0.28±0.18	50	0.45	1.40	0.14
Distorted image	03	0.24	0.20	0.04±0.2	16.67	0.2	0.2	0.83
Floaters	09	0.72	0.48	0.24±0.18	33.33	0.44	1.35	0.26
Black spot in front of the eyes	09	0.68	0.48	0.20±0.18	29.41	0.40	1.09	0.21

Table-26: Overall Effect of Therapy

Total effect	Number of patients	Percentage
Cured	00	00
Marked improvement	03	12
Moderate improvement	01	04

Mild improvement	16	64
Unchanged	05	20

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